City of Alexandria, Virginia
**Department of
Transportation and Environmental Services**
P. O. Box 178 - City Hall
Alexandria, Virginia 22313

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Water Docket
Environmental Protection Agency
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Docket Number EPA-R03-OW-2010-0736
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Subject: City of Alexandria Supplemental Comments for Docket Number EPA-R03-OW-2010-0736 Draft Chesapeake Bay Total Maximum Daily Load dated September 24, 2010

Thank you for the opportunity to comment on the Draft Chesapeake Bay Total Maximum Daily Load (TMDL) dated September 24, 2010. The City has submitted overall substantive comments separately, but wishes to provide these supplemental comments which are specific to issues related to Combined Sewer System. Like many older communities in Virginia, such as City of Richmond and City of Lychburg, part of the City is served by a combined sewer system (CSS). These CSS communities, including the City of Alexandria, have submitted comments specific to the issues related to Combined Sewer System. The City agrees with these comments and a copy of these comments is also attached with this letter for your consideration.

We are very appreciative for the opportunity to comment on this Draft and hope that we have provided comments that will not only assist in creating the Final Phase I TMDL, but will also begin to elucidate some of our continued concerns as we move forward in our enhanced participation in the Phase II TMDL process. We will continue to work with our local, state and federal partners to protect and restore local waterways, the Potomac River, and the Chesapeake Bay.

Best regards,

Lalit K. Sharma, P.E.
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Attachment: Comments on the Draft Chesapeake Bay TMDL by the Alexandria Sanitation Authority, and the Cities of Alexandria, Lynchburg, and Richmond

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Comments on the Draft Chesapeake Bay TMDL by the Alexandria Sanitation Authority, and the Cities of Alexandria, Lynchburg, and Richmond

Docket Number EPA-R03-OW-2010-0736

November 8, 2010

I. INTRODUCTION

The Alexandria Sanitation Authority (ASA) and the cities of Alexandria, Lynchburg, and Richmond (the "Communities") appreciate the opportunity to submit these joint comments on the U.S. Environmental Protection Agency's (EPA's) September 24, 2010 draft Chesapeake Bay Total Maximum Daily Load (TMDL). These comments are directed specifically at the waste load allocations (WLAs) required to accommodate total nitrogen (TN), total phosphorus (TP), and total suspended solids (TSS) loads in discharges of combined sewer flows from Alexandria's, Lynchburg's, and Richmond's combined sewer overflow (CSO) outfalls and discharges of captured combined sewer flow that is treated and discharged by the ASA, Lynchburg, and Richmond wastewater treatment plants (WWTPs).

Exhibit A to these comments contains a description of the Communities' combined sewer systems (CSSs) and CSO control programs. The following overview describes the key program elements and system features that are relevant to establishing appropriate WLAs for these systems.

II. OVERVIEW OF RELEVANT PROGRAM ELEMENTS AND SYSTEM FEATURES

A. Program Elements

All of the Communities adopted the demonstration approach authorized in EPA's CSO Control Policy[1] in their long-term control plans (LTCPs). Each Community is implementing a different Virginia Department of Environmental Quality-approved CSO control program based on local factors and circumstances, as provided under the CSO Policy. Alexandria's approved LTCP employs a capture and treat approach to CSO control, and continues implementing the Nine Minimum Controls (including maximizing flow to the Alexandria Sanitation Authority's advanced water reclamation plant) as a requirement of its permit. Lynchburg's LTCP provides for total separation of its combined system; however, the City is presently updating its LTCP and may decide to convey and treat combined flow in the remaining downtown area rather than separating

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[1] 59 Fed. Reg. 18,688 (April 19, 1994). The Policy has been incorporated by reference into the Clean Water Act (CWA). See CWA § 402(q), 33 U.S.C. § 1342(q).

that part of its system. Richmond's LTCP calls for conveyance, storage, and treatment of combined flows as well as limited sewer separation.

B. Status of Program Implementation

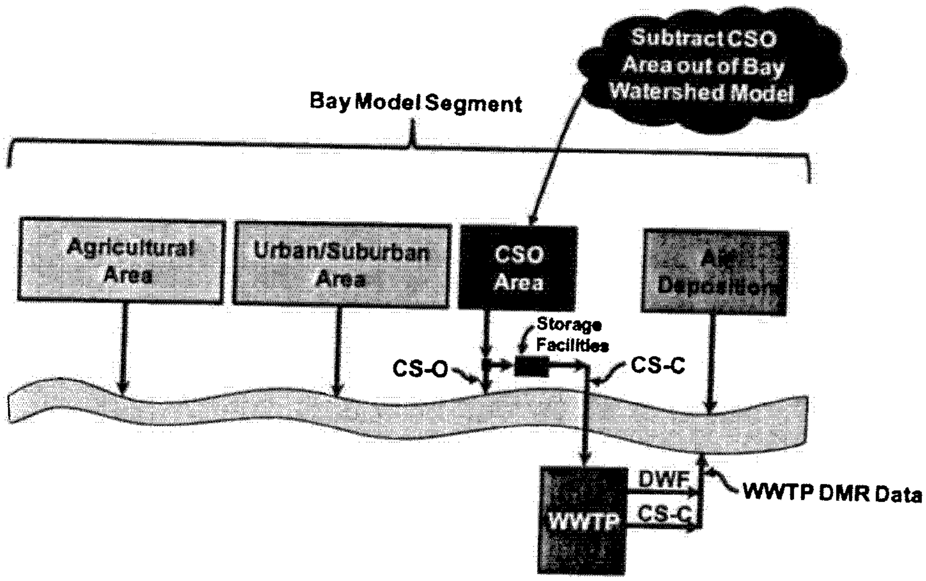
The Communities are at different stages in the implementation of their LTCPs, which, collectively, involve capital investments totaling approximately $1 billion in today's dollars and millions of dollars in annual operation and maintenance costs. The City of Alexandria has progressed to the post-construction monitoring phase, and employs a target-of-opportunity approach for re-development projects to separate combined sewers under its non-regulatory Area Reduction Plan. Lynchburg has separated approximately 50 percent of its combined system as required by its VPDES permit and State consent special order at a cost of approximately $168 million. Richmond has completed two phases of its three-phased LTCP at a cost of approximately $267 million as required by its VPDES permit and State order. Both the Lynchburg and Richmond orders establish schedules for construction of the controls in their LTCPs. Neither city is expected to complete construction until after 2025 given the magnitude of the estimated remaining costs in today's dollars ($326 million for Lynchburg, and $500 million for Richmond) and highest rates in the state as a percent of median household income (MHI). Alexandria, Richmond and Lynchburg are required by their VPDES permits to continue implementing the Nine Minimum Controls, including maximizing combined flows to their WWTPs.

C. System Features

The Communities' discharge combined sewer flow from both individual CSO outfalls and from the WWTPs serving their CSSs. Discharges from CSO outfalls occur during rainfall events that produce combined flows exceeding the wet weather design capacities of the conveyance, storage and treatment facilities. In order to meet the applicable water quality-based requirements, the Communities have either significantly reduced or are in the process of significantly reducing the volume, duration and number of discharges from their CSO outfalls by conveying, storing and treating the combined flows and/or by separating parts of their CSSs. Combined flows that do not exceed the design capacities of the conveyance, storage, and treatment facilities are conveyed to and treated at the WWTPs serving the Communities. Currently, combined flows conveyed to the WWTPs receive complete treatment. Consistent with the CSO Policy, however, future controls may include partial treatment of combined sewer flows to meet bacteria WLAs.

The illustration in **Figure 1** reflects system features that are common to all of the Communities in the context of the input to the Bay Watershed Model.

Figure 1



(1) Dry Weather Flow (DWF): DWF is the sanitary portion of the flow discharged from the WWTP. Annual changes in this flow are primarily associated with the population growth of the community in the same way as the flows for a community served by a separate sewer system. Pollutant concentrations are controlled by the design and operation of the WWTP facilities.

(2) Combined Sewer Captured (CS-C): CS-C is the sanitary and storm water portion of the flow captured, stored, treated and discharged from the WWTP. The CS-C portion of the WWTP flow is highly dependent on the amount of rainfall received during a given year. The amount captured, stored and treated at the WWTP is also a function of how the rain falls (i.e. less is captured from an intense summer storm as compared to a slow all-day rainfall). In general, as improvements to the CSS are implemented that capture more CSO flows (and if these flows are treated at the WWTP), the annual average flow at the WWTP will increase. The Discharge Monitoring Report (DMR) flows (comprised of DWF and CS-C) reported by the WWTPs will vary based on the rainfall pattern received in a given year. For some storms, WWTPs will be able to provide full treatment and therefore pollutant concentrations will be the same as the DWF. For other storms, pollutant concentrations will be higher than the DWF even though treatment is being provided at the WWTP.

(3) Combined Sewer Overflow (CS-O): CS-O is the portion of the flow that is not captured by the intercepting system and is released at the permitted CSO outfalls. The amount of CS-O released from the outfalls is a function of the total rainfall and how the rain falls as described for CS-C above. In addition, the pollutant concentration in the CS-O will vary with each storm. The CS-O is reduced by separation or by capture and treatment.

The City of Richmond's CSS offers a good example of the way that above-described system features operate in response to wet weather events. The City has been operating its 50 million gallon combined sewer storage facility for about 30 years. After storm events, the stored CS-C flow is sent to the WWTP over a two-day period. Thus, the DMR data includes both DWF and CS-C flow as shown in **Figure 2**. **Figure 2** is the actual annual average flow, in million gallons per day (mgd), for the Richmond WWTP for the period 1991 through 2006. As can be seen in this figure, the flow discharged from the WWTP is significantly influenced by the rainfall pattern from year to year. For example, the average WWTP flow for the period between 1991 and 2000 is about 50.7 mgd. During 1994, annual average flow was about 58 mgd, and in 2004 the annual average flow was about 63 mgd. The difference in flows is associated with the amount of CS-C treated at the WWTP.

The DWF changes for Richmond are associated with the growth in Goochland County, which started sending DWF to Richmond in 2006. The Richmond WWTP has a permitted DWF capacity of 45 mgd. This is to ensure that treatment of additional sanitary flow is provided to accommodate additional customers. **Figure 3** shows that if the WWTP had been operating at its full permitted DWF capacity, the total flow from the WWTP would have increased, even though the amount of CS-C treated at the WWTP would have remained the same.

Figure 2
Current Richmond WWTP Annual Average Flow

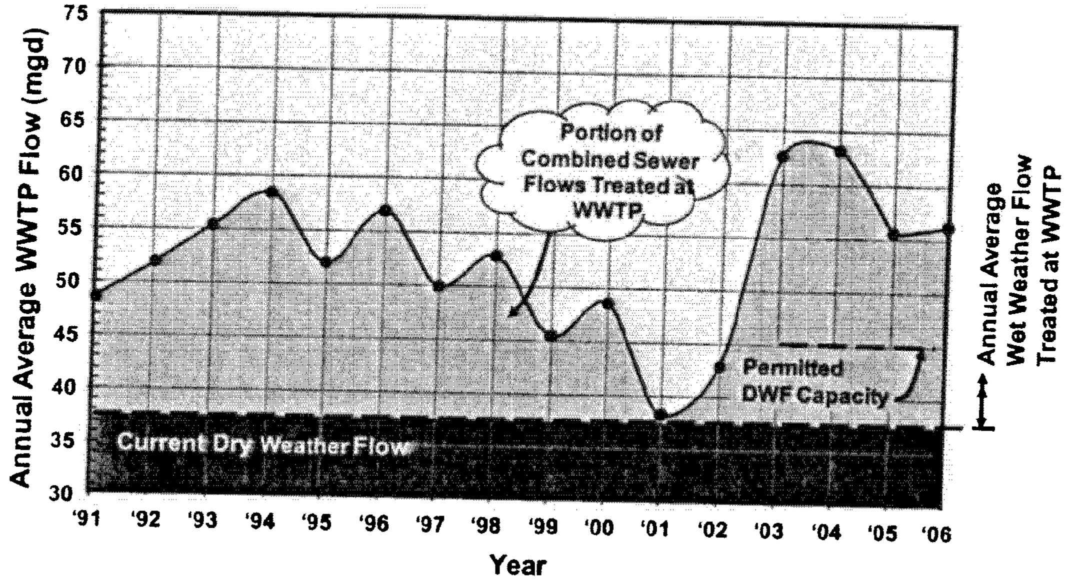
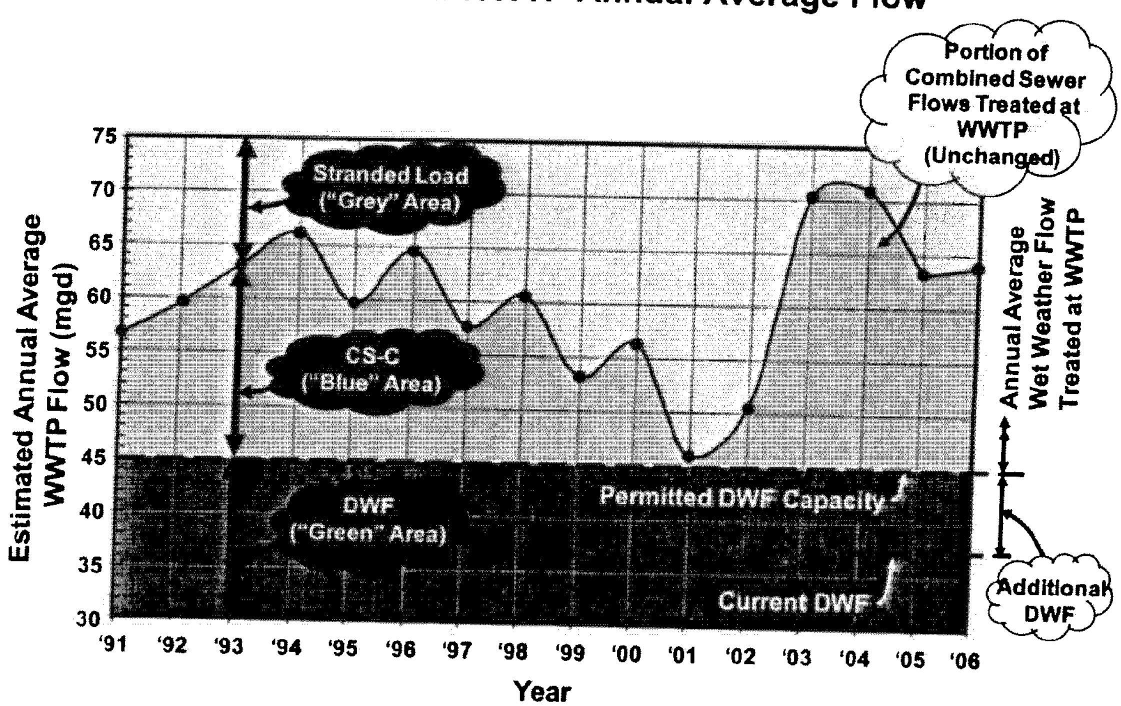


Figure 3
Future Richmond WWTP Annual Average Flow



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D. System Nutrient and Sediment Loads

Approximately 95 to 99 percent of the wet weather CSS flow that either is discharged through CSO outfalls or conveyed to the WWTP (or other treatment facility) for treatment is storm water. Therefore, wet weather CSS flows generally are large in volume, but the concentrations of TN and TP in these flows are small when compared to the nutrient concentrations in separate sanitary sewer system flows. The Communities' CSO control programs reduce the discharge of TN and TP in both the sanitary and storm water components of their combined flows by maximizing conveyance and complete treatment of combined flows within the design capacities of their plants as part of the Nine Minimum Controls required by EPA's CSO Control Policy.

The Communities have already achieved almost all of the nutrient load reductions and much of the sediment load reductions associated with their CSO control programs by virtue of having maximized combined flows through complete treatment. Furthermore, independent of their CSO control obligations, the Communities are currently on target to achieve nutrient reductions at their WWTPs by the end of 2010 as called for by the Virginia tributary strategies.[2,3] While Richmond's LTCP (and possibly Lynchburg's LTCP) calls for the installation of additional capacity at the WWTPs to treat larger combined flow volumes in the future, this capacity is associated with disinfection facilities. This additional capacity will transfer some of the nutrient and sediment load now discharged from CSO outfalls to the WWTP, but will not change the total nutrient and sediment load from the CSS.

III. VIRGINIA'S DRAFT WATERSHED IMPLEMENTATION PLAN REFLECTS THE CORRECT APPROACH FOR ESTABLISHING WLAs FOR COMBINED SEWER SYSTEMS

The WLAs proposed for the Communities' CSSs in Virginia's September 2010 draft Phase I Watershed Implementation Plan (WIP) reflect the Virginia Department of Environmental Quality's (VDEQ's) and the Virginia State Water Control Board's long-standing familiarity with the Communities' systems and control programs. These agencies have reviewed and approved the Communities' LTCPs, issued and reissued VPDES permits for the CSSs for over 20 years, and issued consent orders establishing schedules for the implementation of Richmond's and Lynchburg's LTCPs. The WIP also reflects the considerable information that the Communities have shared with VDEQ over the last year related to the CSS nutrient and TSS loads. Virginia's approach to establishing WLA for the Communities embodied in the WIP is summarized in **Table 1**.

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[2] Commonwealth of Virginia, Office of the Governor. *Chesapeake Bay Nutrient and Sediment Reduction Tributary Strategy for the James River, Lynnhaven and Poquoson Coastal Basins*. March 2005.

[3] Commonwealth of Virginia, Office of the Governor. *Chesapeake Bay Nutrient and Sediment Reduction Tributary Strategy for the Shenandoah and Potomac River Basins*. March 2005.

Table 1

Virginia WIP's Approach for Establishing CSS WLAs

Locality	WWTP DWF WLA[1] (Includes only DWF)			Aggregate CSS WLA[2] (Includes CS-C & CS-O)			Total CSS Community WLA (Includes DWF, CS-C, & CS-O)		
	TN (lbs/yr)	TP (lbs/yr)	TSS (lbs/yr)	TN (lbs/yr)	TP (lbs/yr)	TSS (lbs/yr)	TN (lbs/yr)	TP (lbs/yr)	TSS (lbs/yr)
City of Richmond	1,096,402	68,525	4,111,506	409,557	34,901	3,396,550	1,505,958	103,426	7,508,056
City of Lynchburg	536,019	33,501	2,010,070	58,575	5,951	677,741	594,593	39,453	2,687,811
Alexandria Sanitation Authority	493,381	29,603	986,761	7,309	329	10,964	500,690	29,932	997,725
City of Alexandria	—	—	—	5,201	690	62,355	5,201	690	62,355
						Total	2,606,443	173,501	11,255,947

Note: (1) Richmond, Lynchburg, and ASA waste load allocations are based on annual average flows of 45 mgd, 22 mgd, and 54 mgd, respectively. During wet weather flows events, the WWTP discharges for Richmond and Lynchburg shall achieve a TN concentration of 8.0 mg/L, a TP concentration of 0.5 mg/L, and a TSS concentration of 30 mg/L and the AWTF discharges for ASA shall achieve a TN concentration of 4.0 mg/L, a TP concentration of 0.18 mg/L, and a TSS concentration of 6 mg/L.

(2) The combined sewage captured (CS-C) portion of the Aggregate CSS WLA is determined based on the annual average volume in the "blue" (CS-C) portion of **Figure 3** for the period 1991 through 2000 multiplied by the wet weather concentration limitations identified in the preceding footnote (1).

WLAs for the dry weather flow treated at the Communities' WWTPs ("DWF" in **Figure 1** above) are correctly included in the WLAs assigned in the WIP to the significant dischargers, which are based on the Tributary Strategy concentrations. The Richmond and Lynchburg Tributary Strategy concentrations for the dry weather TN, TP, and TSS are 8.0, 0.5, and 30 mg/L, respectively. The ASA Tributary Strategy concentrations for the dry weather TN, TP, and TSS are 3.0, 0.18, and 6 mg/L, respectively. The WWTP permit must contain a performance standard in the form of a concentration limitation for wet weather flows above the permit dry weather design flow capacity, which will encourage operators to empty CSO storage facilities as fast as possible (maximize wet weather treatment). This will prepare the storage facilities to capture more volume from the next storm and have the net effect of increasing the annual volume treated, which will maximize the overall pollution removal. This is consistent with EPA's CSO Control Policy requirements to maximize the flow treated at the WWTP. The **Table 1** footnotes must be included in the TMDL report to provide the proper guidance to the NPDES permit writers and document the assumptions used to establish the WLAs.

The CSS WLAs proposed by Virginia in its WIP correctly assign WLAs to the two sources of nutrient and TSS loads from the Communities' combined sewer systems as summarized in **Table 1**. **Table 1** includes (1) flows that are captured and conveyed to the WWTPs for treatment ("CS-C" in **Figure 1** above) , and (2) flows that exceed the conveyance and treatment capacity of the CSS and WWTP and are discharged from CSO outfalls ("CS-O" in **Figure 1** above). The WIP correctly shows the WLAs for the City of Alexandria's CSO outfalls ("CS-O") and captured combined sewer flow ("CS-C") treated at the ASA's WWTP as separate allocations because the CSO outfalls and the WWTP are permitted separately. The WLAs for Richmond's and Lynchburg's captured combined sewer flow and CSO outfalls are correctly aggregated (shown as "Aggregate CSS" in the Tables) in Virginia's WIP. Aggregating the CSS WLA's affords Richmond and Lynchburg the flexibility to maximize CSS flows to their WWTPs (as required by their permits and EPA's CSO Control Policy) without risk of exceeding the WLAs in the WIP.

The WIP correctly describes the basis for Virginia's proposed CSS WLAs, including event mean concentration data for the CSO outfalls, model-predicted 1991-2000 CSO discharge volumes, and WWTP flow and concentration data used to derive the WLAs. See WIP at pages 32-35. EPA should adopt the approach reflected in Virginia's WIP, which bases the WWTP WLAs on the DWF and CS-C average of the '91-'00 flows and footnote to the allocations to provide guidance to the permit writer to use a performance standard (concentration, not loads) for flows above the DWF design capacity. Virginia's approach would avoid consuming allocations needed by other sectors, promote maximizing flow through the WWTP consistent with the CSO Control Policy, and will better reflect the loading in the water quality model associated with the actual '91-'00 hydrology. Further, the WIP provides permitting guidance that is fully consistent with the CSO Control Policy, NPDES permit regulations, and EPA guidance pertaining to wet weather permitting as reflected in the following overview.

The CSO Control Policy requires CSO communities to develop and implement LTCPs that provide for compliance with the applicable water quality-based requirements of the Clean Water Act. CSO communities may base the LTCPs either on the "presumptive" approach where the LTCP is presumed to provide for compliance with the applicable requirements if it meets one of several specified discharge criteria, or the "demonstration" approach where the community must demonstrate through data, modeling and/or other acceptable methods that its LTCP will provide for compliance with applicable requirements. See CSO Policy at II.C.4. As explained above, all of the Communities have selected the demonstration approach. Permitting authorities are instructed to include LTCP-derived performance standards and requirements based on average design conditions in NPDES permits issued to those CSO communities that have developed LTCPs using the demonstration approach. See CSO Policy at IV.B.2.c.

Water quality-based effluent limits are numeric performance standards for selected CSO controls, such as concentration limitations for wet weather at the WWTP or flow or volume capacity of the facilities identified in the LTCP. See CSO Policy at IV.B.2.c. Rainfall durations, frequencies and intensities vary from storm to storm and across the CSO watersheds. Additionally, the periods between rainfall events vary and cause loads to build-up and wash off at different rates, which makes it infeasible to determine numerical mass effluent limitations for wet weather flows (WWFs) associated with the CSS. The controls in the LTCP, including WWF treatment controls at the WWTP, represent Best Management Practices (BMPs) that may be designed to meet the CSO related WLAs from the TMDL. See 40 C.F.R. § 122.44(k) and 40 C.F.R. § 122.44(d)(1)(vii)(B). The WLAs proposed in the WIP were developed based on the LTCP performance standards, which should achieve the WLAs using the same modeling that EPA and/or the Communities used to derive the WLA for wet weather flows associated with operating the CSS[4]. See 40 C.F.R. § 122.44(d)(1)(vii)(B). The LTCP performance standards are the water quality-based effluent limitations for WWFs associated with facilities in the approved LTCP.

Virginia's approach applies equally to each of the 64 CSO communities in the Chesapeake Bay watershed and should be adopted across the watershed.

IV. THE DRAFT TMDL ERRONEOUSLY FAILS TO INCLUDE THE WLAs PROPOSED BY VIRGINIA IN ITS WIP

While the Draft TMDL incorporates the TN and TP WLAs proposed in the WIP for the CSO outfalls, it erroneously fails to include any WLAs for captured CSS flows treated at the WWTPs. Further, the Draft TMDL reduces the TSS WLAs for the CSO outfalls by 16 to 31 percent, with no explanation of the basis for the TSS WLAs or how they were calculated. These unexplained departures from the WIP are fundamentally inconsistent with the above-described technical, legal, and policy rationales. The Communities urge EPA to incorporate the CSS WLAs and related text in the WIP in the final TMDL.

A. EPA's proposed approach for establishing the CS-C portion of the WLAs

Based on recent meetings and communications among representative of EPA, VDEQ, and the Communities, we understand that EPA does plan to include WLAs for captured combined sewer flow in the final TMDL. However, as reflected in an October 27, 2010 email from EPA (**Exhibit B**), EPA intends to establish these WLAs based on a WWTP fixed design flow capacity rather wet weather-driven CSS flows actually treated by the WWTPs. We believe this approach is arbitrary and fails to reflect the way that a CSS actually works as described above. For these reasons, EPA's approach is not the correct way to establish the WLAs. However, if EPA continues to insist that the WLAs for captured CSS flow treated at the WWTPs be established using fixed annual average flows, the final TMDL should include the WLAs identified in **Table 2** as follows:

[4] 40 C.F.R. § 122.44(d)(1)(vii)(B) requires the permitting authority to ensure that effluent limits developed to protect a narrative or numeric water quality standard are consistent with the assumptions and requirements of any available WLA for the discharge prepared by the State.

Table 2

EPA's Proposed Approach for Establishing the CS-C Portion of the WLAs

Locality	WWTP WLA[1] (Includes DWF & CS-C)			CSO WLA (Includes only CS-O)			Total CSS Community WLA (Includes DWF, CS-C, & CS-O)		
	TN (lbs/yr)	TP (lbs/yr)	TSS (lbs/yr)	TN (lbs/yr)	TP (lbs/yr)	TSS (lbs/yr)	TN (lbs/yr)	TP (lbs/yr)	TSS (lbs/yr)
City of Richmond	1,827,336	114,209	6,852,510	148,857	18,607	2,418,926	1,976,193	132,816	9,271,436
City of Lynchburg	706,570	44,161	2,649,637	36,647	4,581	595,511	743,217	48,741	3,245,148
Alexandria Sanitation Authority	554,292	32,344	1,078,128	--	--	--	554,292	32,344	1,078,128
City of Alexandria	--	--	--	5,201	690	62,355	5,201	690	62,355
						Total	3,278,902	214,591	13,657,067

Note: (1) Richmond, Lynchburg, and ASA waste load allocations are based on annual average flows of 75 mgd, 29 mgd, and 59 mgd, respectively. During wet weather flows events above the flows used to establish the WLA, the WWTP discharges for Richmond and Lynchburg shall achieve a TN concentration of 8.0 mg/L, a TP concentration of 0.5 mg/L, and a TSS concentration of 30 mg/L and the AWTF discharges for ASA shall achieve a TN concentration of 4.0 mg/L, a TP concentration of 0.18 mg/L, and a TSS concentration of 6 mg/L.

The WWTP WLAs in **Table 2** are based on the Tributary Strategy concentrations and annual average flows needed to reliably operate the WWTP during years with high rainfall. ASA's TN concentration would be based on 3 mg/L for flows at and below 54 mgd and 4 mg/L for flows above 54 mgd. WWTPs served by CSSs are susceptible to the effects of snow melts and potentially toxic spills on roadways that may enter the CSS through storm water curb inlets. For example, in 1996, the Richmond WWTP was upset by high salinity runoff water associated with a snow melt event. It took over a month to recover BOD treatment after this event, but nitrification took much longer. If these types of events take place in December or January, it will be difficult to meet the WLAs even on the annual average basis. Additionally, colder wastewater temperatures are common in years with heavy snowfall such as in February 2010 when the Richmond WWTP average monthly temperature was 10.7°C. While the ASA WWTP treats a lower percentage of CSS flow compared to Richmond and Lynchburg, it too may experience nitrification inhibition during extended winter wet weather accompanied by snow melt. WWTPs that serve CSSs should have WLAs that reflect the site-specific treatment challenges that occur during the winter periods.

Table 3 shows the percent change between EPA's "2010 No Action" and EPA's backstop allocation scenarios. It appears that EPA used the agricultural source sector to balance the load reductions to meet the James River basin TMDL allocations, because the TN edge of stream loads increased by 12 percent while the sediment loads decreased by 50 percent. Therefore, if EPA continues to apply backstop allocations, loads to compensate for the CS-C WLAs that EPA missed in the draft TMDL should come from the agricultural source sector, which should not harm agriculture. Agricultural BMPs that target sediment reductions will most likely reduce nitrogen and phosphorus loads as well.

EPA should evaluate the expected performance of the agricultural BMPs and identify the nitrogen and phosphorus loads that could be used to offset the allocations for the CS-C WLA, which should be incorporated into the final TMDL. An example of these calculations is shown in **Exhibit C.**

Table 3

Percent Change between 2010 No Action and EPA's Backstop Allocation

Percent Increase or (Reduction) based on EPA's 2010 No Action Scenario and Allocations in Appendix Q-1							
Major Trib	Source	Delivered			Edge of Stream		
		TN	TP	Sediment	TN	TP	Sediment
James River Basin, Virginia	Agriculture	(9%)	(34%)	(48%)	12%	(38%)	(50%)
	Urban runoff	(36%)	(51%)	(61%)	(39%)	(52%)	(61%)
	PS	(75%)	(86%)	(86%)	(75%)	(84%)	(78%)
	Septic	13%	0%	0%	0%	0%	0%
	forest	17%	4%	3%	(1%)	(2%)	(2%)
	Non-Tidal Water Deposition	9%	5%	0%	0%	0%	0%
All Sources		(52%)	(69%)	(42%)	(42%)	(64%)	(43%)

(1) EPA's proposed approach is flawed.

EPA's proposed approach for establishing WLAs for WWTPs served by CSSs is flawed for the following reasons:

- Inconsistent Loads in Model: The WWTP WLAs will be used as a constant value in the model input deck, which will not match the actual '91-'00 hydrology. **Figure 3** shows an example of natural fluctuations of the annual average flow based on the amount of urban runoff (CS-C) treated at the WWTP, which is directly related to the amount of rainfall in the '91-'00 period. EPA's water quality model used to judge compliance will not recognize the dry weather days and corresponding benefits of the low annual loads during dry years such as the three year period 1998-2000.

- Consumes Allocation Needed by Other Sectors: The WWTP WLAs needed is shown as the "green" (DWF) and "blue" (CS-C) shaded area for the '91-'00 hydrology as shown in **Figure 3**. However, EPA's approach also includes the "stranded load" shown as the "gray" shaded area of **Figure 3**, which arbitrarily consumes allocations needed by the other sectors. For example, the total nitrogen "stranded load" consumed by EPA's approach is about 672,460 pounds per year as shown by the differences in **Tables 1 and 2** (above). However, if EPA continues with its approach, the allocations provided in **Table 2** would be needed to handle the 2003 or 2004 annual average loads.

- Does Not Promote Maximizing Combined Sewer Flow Treatment at WWTP: Even with the annual average flows provided in **Table 2**, there may be years with more rainfall than 2003 and 2004 that will require allocations larger than those shown in **Table 2**. Establishing the allocations as a hard cap does not promote maximizing flow through the WWTP, which is required by EPA's CSO Control Policy. WWTP operators would have to judge whether accepting additional wet weather flow would put them at risk of exceeding their mass permit limitation (i.e. penalized for treating wet weather flow). This is completely inconsistent with the CSO Control Policy. If the WWTP permit contained a concentration limitation for wet weather flows (flows above the permit design capacity), the operator would be encouraged to empty the CSO storage facilities as fast as possible, which would prepare the storage facility to capture more volume from the next storm. Otherwise, the portion of the wet weather flow that could have been captured, had the WWTP operators not being placed at peril of exceeding the allocations, would instead be discharged at the permitted CSO outfalls. Therefore, if EPA is going to continue with its proposed approach, it must include the performance standards for wet weather flows that exceed the flows used to establish the WLAs in **Table 2**. Additionally, it is also important that EPA include the **Table 2** footnotes in EPA's TMDL report to provide the proper guidance to the NPDES permit writers and document the assumptions used to establish the WLAs.

(2) EPA's current approach will create problems during future Progress Runs

EPA has explained that it will use the monthly DMR flows as the basis to monitor progress toward compliance with the WLAs. Progress Runs will use the most recent monthly flows from WWTP DMRs and apply those flows to the each model year between 1991 and 2000. This may be appropriate for WWTPs served by separated sewer systems, but this approach should not be used for WWTPs serving a CSS.

The combined system DMR flows (comprised of DWF and CS-C) reported by the WWTPs will vary based on the rainfall pattern received in a given year. It will not be possible to discern from the DMR data the changes in flow associated with growth (DWF) from the variability of rainfall from year to year (CS-C) as reflected in the variability in annual average flow shown in **Figure 3**. If EPA uses the actual monthly DMR flow data from a combined system for the Progress Run (i.e. 2002 Progress Run versus 2004 Progress Run) and attempts to use these flows in each year between 1991 through 2000, the flows (i.e. 2002 or 2004) would not match the '91-'00 hydrology. The 2002 DMR flows inputted for each year between 1991 and 2000 would have suggested load reductions that, in reality, would not have occurred (2002 flows were less than all the flows in the '91-'00 period). Conversely, the 2004 DMR flows are higher than all the flows in the '91-'00 period and would have suggested a lack of progress (higher loads compared to 2002 progress run). EPA and VDEQ will have trouble trying to explain to the public the differences between progress runs similar to 2002 or 2004 under EPA's DMR approach.

EPA should include in the model separate inputs for DWF, CS-C and CS-O, such that each component can be tracked separately. The DWF discharged from the WWTP will change in the same way as the flows for community served by a separate sewer system. For combined sewer portions, if the CS-O is reduced by separation or by capture and treatment, the combined sewer system model will estimate the amount of combined sewer overflowed for the period 1991 through 2000 after each major improvement to the CSS. If the CS-O is reduced by separation, the CS-O would be moved to the Urban Runoff (MS4) source sector. If the CS-O is reduced by capture and treatment, the CS-O would be moved to the CS-C. Tracking the flows as separate inputs would allow EPA to use this approach to monitor the progress for each of the 64 CSO communities in the Chesapeake Bay watershed and would lead to consistency between progress runs.

Virginia's approach to developing allocations and monitoring progress is based on its years of experience with advanced CSO LTCPs. EPA should adjust its modeling, basis for allocations, and monitoring to take advantage of Virginia's experience.

B. The WLAs for combined sewer overflow (CS-O) do not match the WIP

(1) The distribution of loads to river segments is not correct

The Communities provided GIS boundaries for their CSSs. EPA has apparently further segmented the GIS data in an attempt to assign the loads to much smaller stream segments. In Appendix Q-1 of the Draft TMDL Report, it appears that EPA has incorrectly assigned a portion of the Richmond CSO load to the Chickahominy River segment. There are large interceptors that direct the flow tributary to the James River tidal fresh segment, which has a delivery factor of 1.0. Even the land area that EPA believes is in the free flowing James River has been intercepted and is materially diverted to the tidal fresh segment. Given the close proximity of all the Richmond permitted CSO outfalls to the fall line, it would be reasonable to include in the model a single CSO allocation under the tidal fresh segment of the James River, which has a delivery factor of 1.0.

The TMDLs are calculated for 92 segments in the Chesapeake Bay and tidal tributaries. As discussed previously, the CSS operates as a system; therefore, it is inappropriate to disaggregate the CSS loads to smaller segments that discharge into the same TMDL segment. Appendix Q-1 of EPA's Draft TMDL includes multiple discharge points based on EPA's interpretations of minor stream segments for CSO permit outfalls for Alexandria and Lynchburg. EPA should aggregate the CSO loads for each community.

(2) The total suspended solids allocations for the CSO outfalls are not correct

The overall TP and TN allocation is consistent with data provided by the Communities and included in the WIP, however, the TSS WLAs for the CSO outfalls for

Richmond, Lynchburg, and Alexandria are lower by 16, 17 and 31 percent, respectively, than the data provided in the VA WIP. EPA has offered no explanation or justification for reducing the scientifically-based TSS WLAs proposed in the WIP. EPA should use the TSS data provided in the WIP when it establishes the final TMDL.

V. THE CHLOROPHYLL-a WATER QUALITY MODEL SHOULD NOT BE USED TO ESTABLISH THE JAMES RIVER ALLOCATIONS

It does not appear that EPA's use of the chlorophyll-a water quality model to establish the James River allocations played a direct role in EPA's failure to include WLAs for captured CSS in the draft TMDL. However, use of this model and the resulting dramatic cuts in the James River allocations will have significant adverse consequences for Richmond's and Lynchburg's CSO control programs by greatly increasing their overall cost of wastewater treatment; thus making an already immense financial burden even greater. As explained above, both cities are already burdened with the highest wastewater rates in the state and have committed to future CSO control costs totaling over $700 million in today's dollars. Preliminary estimates indicate that the backstop allocations in the draft TMDL would further increase the combined total cost of storm water control and wastewater treatment (exclusive of CSS control) for the cities to as much as $1.7 billion and increase their total wastewater costs to over three percent of MHI. Although the cities employ different rate structures to fund the cost of their water quality programs (wastewater treatment, CSO control, and storm water), it is their residents who bear the burden of paying for these programs. There is a limit to their ability to pay, and it now appears that the combined costs of the cities' CSO control programs together with the added costs that would be imposed by the James River backstop allocations are beyond their individual financial capabilities. Moreover, it is apparent that the chlorophyll-a model-based allocations do not have a sound scientific basis.

Others such as the Virginia Association of Municipal Water Agencies (VAMWA), the Virginia Association of Municipal Stormwater Agencies (VAMSA)[5], and the Hampton Roads Planning District Commission (HRPDC) (on behalf of the Hampton Roads localities with Municipal Separate Storm Sewer Systems) either have or will be submitting comments on EPA's use of the chlorophyll-a model to establish the James River allocations. To summarize, those comments point out that since 2009, the regulated community has urged EPA to address significant issues relating to the accuracy of the chlorophyll-a modeling predictions, including erroneous calibration in certain segments and seasons, model post-processing problems, unexplained model anomalies, and the improper use of data. VAMWA's VAMSA's, and HRPDC's comments further point out that EPA has not only failed to undertake the systematic review and analysis of the model's predictive capabilities needed to fix these problems, it has improperly manipulated the model. Richmond and Lynchburg agree with the objections (as well as the basis for those objections) to EPA's use of the chlorophyll-a model set forth in

[5] Richmond and Lynchburg are members of both VAMWA and VAMSA.

VAMWA's VAMSA's, and HRPDC's comments and incorporate them by reference rather than repeating them here.

In addition to unresolved flaws in the model, the model predictions are unable to reliably distinguish between model scenarios with immense cost implications for Richmond and Lynchburg as shown in the following knee-of-curve analysis, which was prepared by one of the Communities' consulting engineers, Greeley and Hansen.

Figure 4

Knee-of-the-Curve Analysis for James River Chlorophyll-a WQS

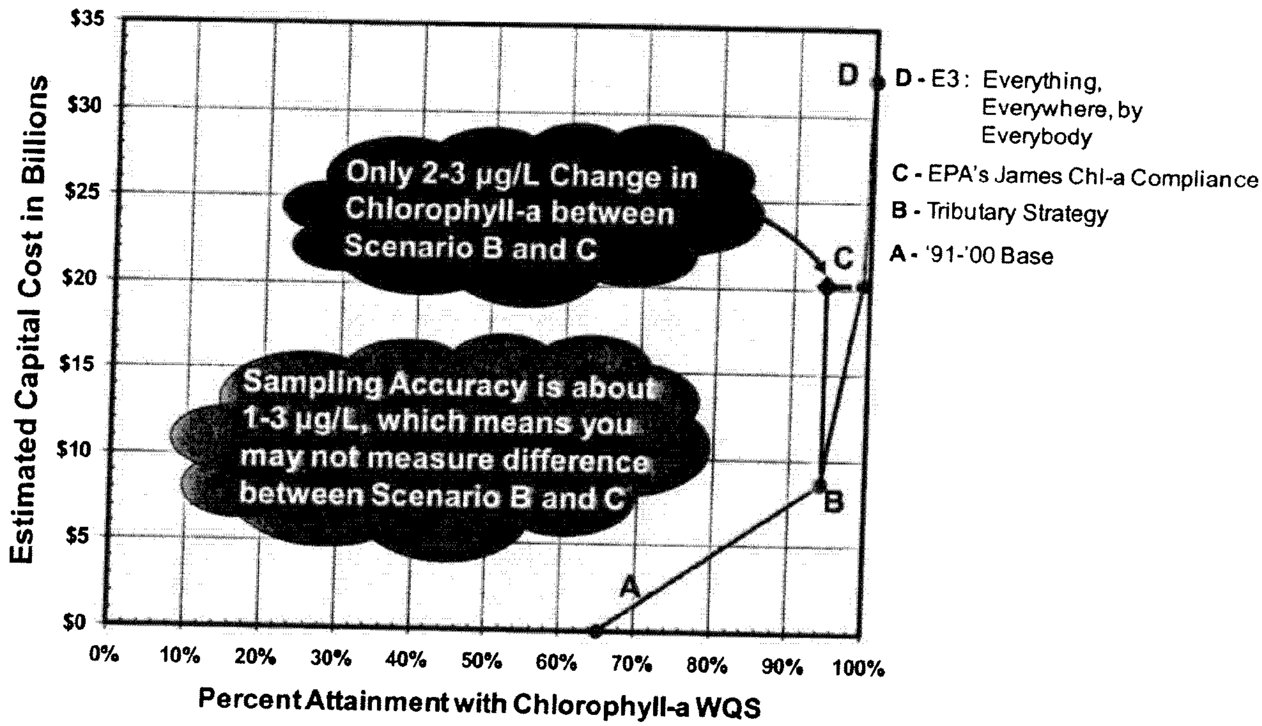

Figure 4 shows the estimated capital costs of attaining the chlorophyll-a criteria against the percent attainment rate. The capital costs include estimates for basin-wide wastewater treatment plant reductions, agricultural BMPs, and urban runoff controls necessary to meet the allocations identified by EPA for the scenarios identified in **Figure 4**. The wastewater treatment plant capital costs are a function of design flows and level of treatment (biological nutrient removal, enhanced nutrient removal and limit of technology). Agricultural capital costs are based on BMP unit cost per acre and the BMP assumptions used in the Phase 5.3 Model. The urban runoff capital costs[6] are based on the performance associated with the runoff reduction method for an estimated amount of retrofit controls that could be installed in a locality, which represents only a portion of the

[6] Urban nutrient management was not included. The capital costs are based on meeting the waste load allocation for the Urban Runoff identified in Appendix Q-1 of the TMDL report.

urban runoff costs. The costs for the remainder of the urban runoff reductions needed to meet the allocations would be achieved with storage and reuse. The estimated capital costs were prepared for the following EPA Scenarios:

- '91-'00 Base Scenario: Point "A" represents the James River TN and TP loading of 36.9 and 3.3 million pounds per year, respectively.

- EPA's Tributary Strategy: Point "B" represents the James River TN and TP portion of the Bay-wide loading, which is 27.5 and 3.3 million pounds per year, respectively.

- EPA's James Chl-a Compliance: Point "C" represents the James River TN and TP loading of 23.5 and 2.35 million pounds per year, respectively. EPA has selected this scenario as the basis for compliance with the James River chlorophyll-a criteria. EPA also refers to this scenario as "James Level of Effort at ½ Potomac". In Appendix J to the TMDL Report, EPA states "In the James, the nutrient loads are equivalent to the level of effort half way between Virginia's portion of the Potomac and the James for the 190/12 Loading Scenario."

- E3 (Everything, Everywhere, by Everybody): Point "D" represents the James River TN and TP loading of 16.1 and 1.5 million pounds per year, respectively. EPA considers this to be the "theoretical maximum levels of managed controls on all pollutant load sources". There are no cost and few physical limitations to implementing controls for point and nonpoint sources in the E3 scenario. This scenario is used with the No-Action scenario to define the "controllable" loads, i.e., the difference between No-Action and E3 loads." See TMDL Report at Appendix J.

The knee-of-the-curve analysis determines where the increment of pollution reduction achieved in the receiving water diminishes compared to the increased costs. There is a steep inflection at Point "B" that represents the knee-of-the-curve. Any reduction beyond Point "B" lacks a viable cost-to-benefit ratio and does not reflect a reasonable level of attainment. EPA has selected Point "C" as the basis for the James River compliance with the chlorophyll-a criteria, which is about half way between Point "B" and EPA's E3 scenario (Point "D"). If one assumes that the model predictions are accurate (about which there is substantial doubt), at Point "B", the James River would be 93 to 94 percent compliant with chlorophyll-a criteria compared to 99 percent at Point "C". However, the true difference in chlorophyll model output between Points "B" and "C" is only 2 to 3 μg/L (three parts in a billion). Additionally, the sampling and testing accuracies for physical water measurements is 1 to 3 μg/L. In other words, even if the loadings between Points "B" and "C" were achieved, it is unlikely that the difference in James River chlorophyll-a concentrations could be measured. The difference in the estimated cost of achieving the loadings between Points "B" and "C", on the other hand, is over $10 billion.

In summary, it is incumbent upon EPA to reconsider the basis for the James River allocations considering the magnitude of the costs of attaining levels of load reductions required to produce a difference in modeled chlorophyll-a concentrations so small that they cannot be reliably measured,. At a minimum, EPA should not pass the knee-of-the-curve identified at Point "B" of the above graph. Assuming there is any water quality improvement beyond Point "B", it would not be cost effective, could not be physically measured, and could not be reasonably attained. Therefore, James River basin allocations should be based on the Tributary Strategy allocations.

VI. EPA HAS FAILED TO PROVIDE A REASONABLE OPPORTUNITY TO REVIEW AND COMMENT ON THE PROPOSED ALLOCATIONS

VAMWA, VAMSA, and HRPDC are also commenting on EPA's failure provide stakeholders with a reasonable opportunity comment on this massive, complex, and controversial TMDL. The Communities agree with these comments and incorporate them by reference rather than repeating them here.

VAMWA's,VAMSA's, and HRPDC's comments note (and we agree) that a 45-day period is far too short to review and comment on the over 2,000 pages of documents posted on the docket. Moreover, the 45-day comment period is inconsistent with Executive Order 12,866, which provides that most rulemakings should include a comment period of not less than 60 days, as well as EPA's own Public Involvement Policy, which stipulates that "the comment period for public review of unusually complex issues or lengthy documents generally should be no less than 60 days".[7]

The Communities further agree with VAMWA, VAMSA, and HRPDC that the opportunity for comment is limited further by EPA's failure to provide all of the information and tools needed to review and evaluate the TMDL. Particularly significant is EPA's failure to make critical components of its TMDL decision support system (such as the Scenario Builder software, the Phase 5.3 Modeling Report, and reliable Phase 5.3 Model source codes and data) available to the modeling community outside of EPA. As HRPDC notes in its comments, without access to these components, modelers retained by stakeholders must blindly accept model inputs from EPA and must rely upon EPA to stitch together various patches and workarounds to get the Model to run. This has the effect of making an already inadequate 45-day comment period even shorter as modelers outside of EPA are forced to wait for EPA to run the Model and produce the results, leaving them without adequate time to evaluate and understand the data. Under these circumstances, there is little that the modeling community can do to apply the Phase 5.3 Model in any independent or meaningful manner within the very limited period of time provided by the comment period.

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[7] See Public Involvement Policy of the U.S. Environmental Protection Agency (EPA 233-B-03-002 - May 2003) at page 13.

VII. CONCLUSIONS AND RECOMMENDATIONS

EPA's failure to include WLAs for the captured CSS flows is arbitrary and has no legitimate technical, legal, or policy basis. EPA should correct this error in the final TMDL by adopting the approach in Virginia's WIP, which bases the WWTP WLAs on the DWF and CS-C average of the '91-'00 flows, and footnote the WLAs to provide guidance to permit writers to use a performance standard for flow above the DWF design capacity. EPA's proposal to establish the WLAs for captured CSS flow based on a fixed WWTP design flow capacity is also arbitrary because it fails to reflect the way that CSSs actually work; however, if EPA continues to insist on this approach, it should establish the fixed WWTP WLAs using the allocations listed in Table 2 above.

EPA's unexplained reductions in the TSS WLAs for the Communities' CSO outfalls is also arbitrary. The TSS WLAs proposed in the WIP are based on data provided by the Communities and are consistent with the basin-wide TSS allocations distributed by EPA. EPA can offer no basis for disputing the validity of these data or a need to reduce the TSS allocations to achieve the basin-wide allocations. EPA should adopt the CSO outfall TSS WLAs proposed in the WIP.

Exhibit A
To Comments on the Draft Chesapeake Bay TMDL by the Alexandria Sanitation Authority, and the Cities of Alexandria, Lynchburg, and Richmond

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Background

1. Overview of the CSO Control Policy

EPA's CSO Control Policy ("CSO Policy" or "Policy")[1] requires CSO communities to develop and implement (1) best management practices known as the Nine Minimum Controls (see Policy at II.B), and (2) Long-Term CSO Control Plans ("LTCPs") that provide for compliance with the applicable water quality-based requirements of the Clean Water Act. CSO communities can base their LTCPs either on the "presumption" approach where the LTCP is presumed to provide for compliance with the applicable requirements if it meets one of several specified discharge criteria, or the "demonstration" approach where the community must demonstrate through data, modeling and/or other acceptable methods that its LTCP will provide for compliance with applicable requirements. See Policy at II.C.4. Permitting authorities are instructed to include LTCP-derived performance standards and requirements based on average design conditions in NPDES permits issued to those CSO communities that have developed LTCPs using the demonstration approach. See Policy at IV.B.2.c. CSO communities that have implemented LTCPs using the demonstration approach must conduct post-construction ambient water quality monitoring to demonstrate that the CSOs remaining after implementation do not cause or contribute to a violation of water quality standards in the receiving waters. See Policy at IV.B.2.d.

2. Overview of the Communities' CSO control programs

Although all of the Communities adopted the demonstration approach in their LTCPs, each is implementing a different DEQ-approved CSO control program based on local factors and circumstances. The City of Alexandria's approved LTCP employs a capture and treat approach to CSO control. The City also continues implementing the Nine Minimum Controls (including maximizing flow to the Alexandria Sanitation Authority's advanced water reclamation plant) as a requirement of its permit. Alexandria is also required by its permit to conduct an extensive post-construction monitoring program for the remainder of its combined sewer system. Lynchburg's LTCP provides for total separation of its combined system; however, the City is presently updating its LTCP and may decide to convey and treat combined flow in the downtown area rather than separating that part of its system. Richmond's LTCP calls

[1] 59 Fed. Reg. 18688 (April 19, 1994). The Policy has been incorporated by reference into the Clean Water Act ("CWA"). See CWA § 402(q), 33 U.S.C. § 1342(q).

for conveyance, storage, and treatment of combined flows as well as limited sewer separation. Collectively, these control programs involve capital investments totaling approximately $1 billion in today's dollars and millions of dollars in annual operation and maintenance costs.

The Communities are at different stages in the implementation of their LTCPs. The City of Alexandria has progressed to the post-construction monitoring phase. Based on post-construction monitoring during multiple permit cycles, DEQ has concluded that the City's CSOs do not cause or contribute to exceedence of water quality standards. Lynchburg has separated approximately 50 percent of its combined system as required by its VPDES permit and State consent special order at a cost of approximately $168 million. Richmond has completed two phases of its three-phased LTCP at a cost of approximately $267 million as required by its VPDES permit and State order. Both the Lynchburg and Richmond orders establish schedules for construction of the controls in their LTCPs. Neither city is expected to complete construction until after 2025 given the magnitude of the estimated remaining costs in today's dollars ($326 million for Lynchburg, and $500 million for Richmond). Both Richmond and Lynchburg are required by their VPDES permits to continue implementing the Nine Minimum Controls, including maximizing combined flows to their wastewater treatment plants.

The Communities' discharge combined sewer flows from both individual CSO outfalls and from the wastewater treatment plants serving their combined sewer systems. Discharges from CSO outfalls occur during rainfall events that produce combined flows exceeding the wet weather design capacities of the conveyance, storage and treatment facilities. In order to meet the applicable water quality-based requirements, the Communities have either significantly reduced or are in the process of significantly reducing the volume, duration and number of discharges from their CSO outfalls by conveying, storing and treating the combined flows and/or by separating parts of their combined sewer systems. Combined flows that do not exceed the design capacities of the conveyance, storage, and treatment facilities are conveyed to and treated at the treatment plants serving the Communities. Currently, combined flows conveyed to the treatment plants receive complete treatment. Consistent with the CSO Policy, however, future controls may include partial treatment of combined sewer flows.

3. <u>Nutrient and sediment loads associated with the Communities' combined sewer systems</u>

Approximately 95 to 99 percent of the wet weather combined sewer system flow that either is discharged through CSO outfalls or conveyed for treatment is storm water. Therefore, wet weather combined sewer flows generally are large in volume, but the concentrations of nutrients in these flows are small when compared to the nutrient concentrations in separate sanitary sewer system flows.[2] The Communities' CSO

[2] The data collected from the Communities' combined sewer systems indicate that nitrogen, phosphorus, and sediment concentrations in untreated CSO discharges average between 4.7 and 8.0 mg/l, 0.8 and 1.0 mg/l, and 70 and 130 mg/l, respectively. The concentration ranges are highly variable because the periods between rainfall

control programs reduce the discharge of nutrients in both the sanitary and storm water components of their combined flows by maximizing conveyance and complete treatment of combined flows within the design capacities of their plants as part of the Nine Minimum Controls required by the CSO Policy.

The Communities have already achieved almost all of the nutrient load reductions and much of the sediment load reductions associated with their CSO control programs by virtue of having maximized combined flows through complete treatment. Furthermore, independent of their CSO control obligations, the Communities are currently on target to achieve nutrient reductions at their treatment plants by the end of 2010 as called for by the Chesapeake Bay Tributaries Strategy. While Richmond's LTCP (and possibly Lynchburg's LTCP) calls for the installation of additional capacity to treat larger combined flow volumes in the future, this capacity is associated with disinfection facilities. This additional capacity will transfer some of the nutrient and sediment load now discharged from CSO outfalls to the treatment plant.

Factors that Should be Considered in Establishing WLAs for the Communities' Combined Sewer Systems

Establishing WLAs for the nutrient and sediment loads discharged from CSO outfalls and combined flows conveyed to the wastewater treatment plants pose unique challenges.

1. CSO Outfalls

In the case of discharges from CSO outfalls, nutrient and sediment loads will vary depending on the system's conveyance, storage, and treatment design capacity as well as antecedent conditions and rainfall duration, frequency and intensity. The CSO Policy calls for CSO communities that are not completely separating their systems to design the capacities of their CSO control facilities around an average rainfall condition, which is reflected in performance standards and requirements in the CSO communities' NPDES permits. See Policy at IV.B.2.c. EPA recommends that CSO communities use historical annual rainfall data to select an average rainfall condition upon which to base the design capacities of their systems. Therefore, annual rainfall which exceeds the average rainfall condition has the potential to cause larger nutrient and sediment loads to be discharged from the CSO outfalls remaining after construction than the loads that would be discharged from these same CSO outfalls in years in which the rainfall is equal to or less than the average annual rainfall condition reflected in the design capacity of the system.

Discharges from CSO outfalls pose many of the same compliance monitoring challenges as discharges from MS4s because they vary significantly with antecedent conditions and rainfall frequency, duration and intensity and are controlled by best

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events vary and cause loads to build-up and wash off at different rates. The type of ground cover will also affect concentrations in combined sewer flows.

management practices (the Nine Minimum Controls). Instead of requiring real-time effluent monitoring for individual CSS outfalls, the Communities' VPDES permits provide for monitoring based on calibrated system flow modeling and event mean concentration ("EMC") data from sampling at representative outfalls. The modeled flows and EMC data are used to calculate and report discharged loads on either a system-wide or individual CSO outfall basis for each rainfall event. However, these loads are not reported for the purpose of demonstrating compliance, but rather for model calibration and to track progress. The compliance demonstration is based on reported system performance compared to the LTCP-derived performance standards and requirements in the permit and the results of the post-construction monitoring program.

2. Combined Flows Discharged from Treatment Plants

As is the case with CSO outfalls, nutrient and sediment loads in combined sewer flows discharged from wastewater treatment plants will vary from rainfall event to rainfall event. Figure 1 demonstrates that there will be years with more rainfall, which results in greater annual average treatment plant flows than the flows used to establish the WLAs. Figure 1 also shows that the annual amount of combined flow treated at the treatment plants is dependent on the random nature of weather patterns, which includes variables such as rainfall intensities, duration, antecedent moisture conditions, ground coverage, and rainfall frequencies and spatial and time distribution. Examples of the spatial and time distribution are shown in Figures 2 and 3 for the City of Richmond, which demonstrates that there can be significant variability in rainfall totals even across an individual communities' CSO watershed. The annual amount of rainfall captured by the control facilities in the LTCPs will be highly dependent of how the rain falls during the storm. A 3" rain that falls slowly over the course of the day will have a significantly higher volume of stormwater capture, than if all of the 3" rain falls in one hour. Thus, accurate quantification and prediction of these many weather pattern variables is infeasible.

Figure 1

Richmond WWTP Annual Average Flow a Function of Rainfall

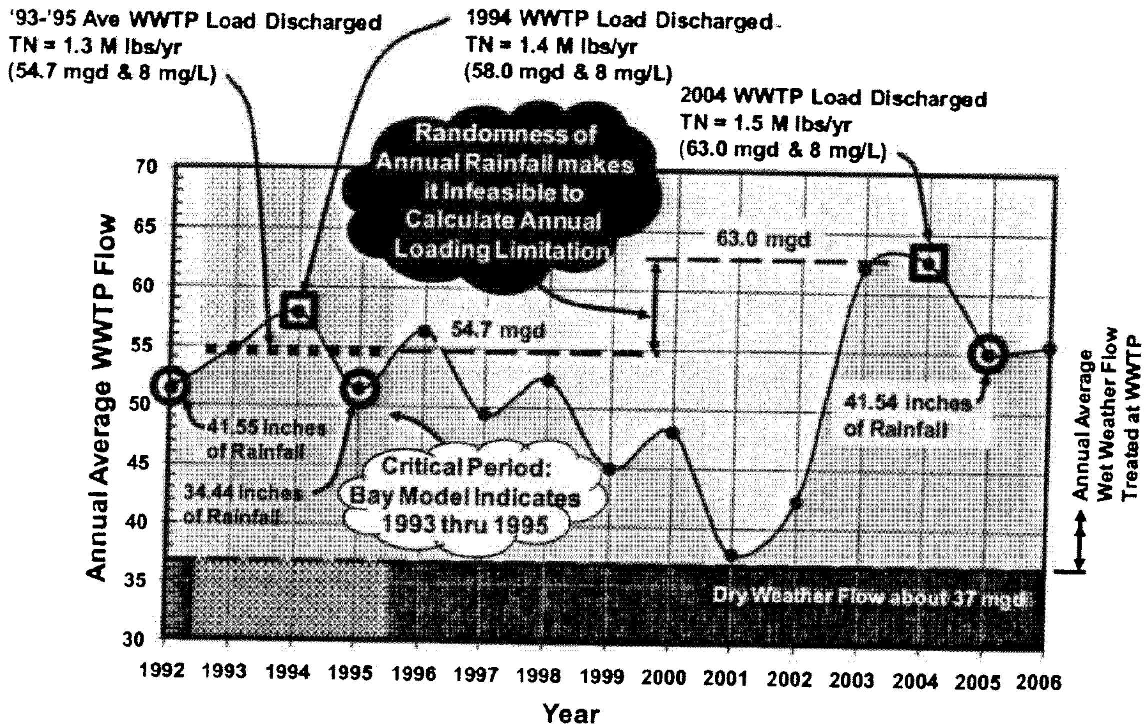
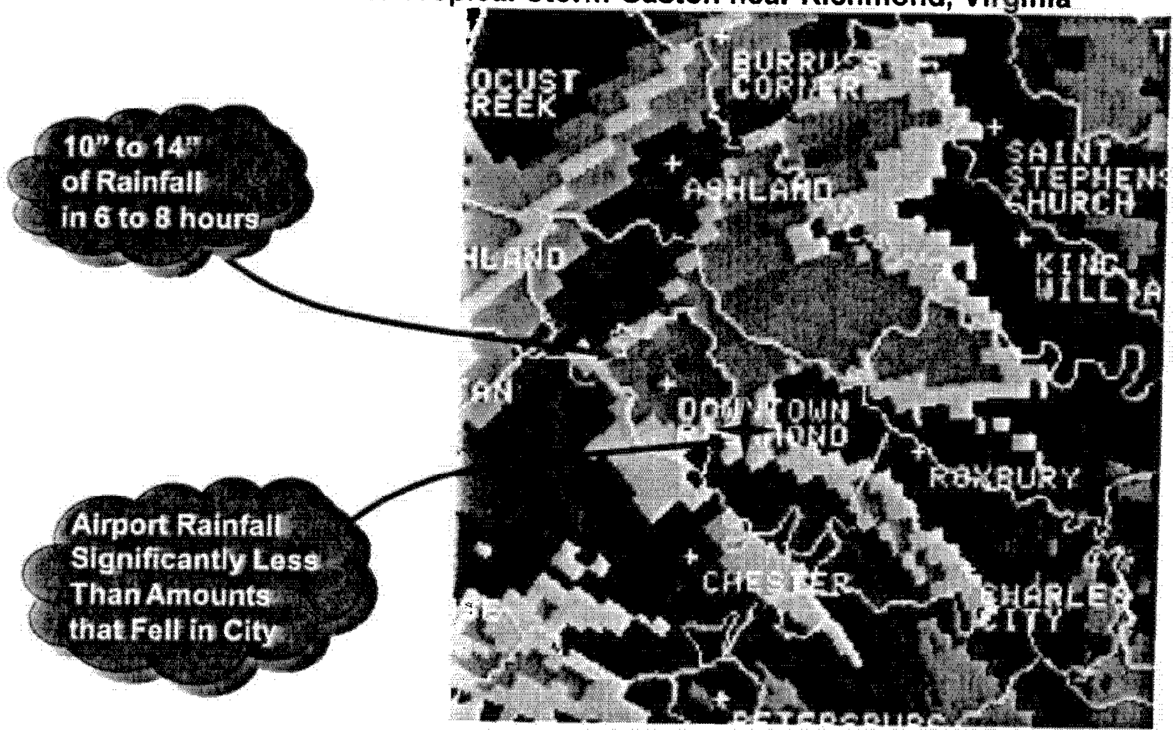
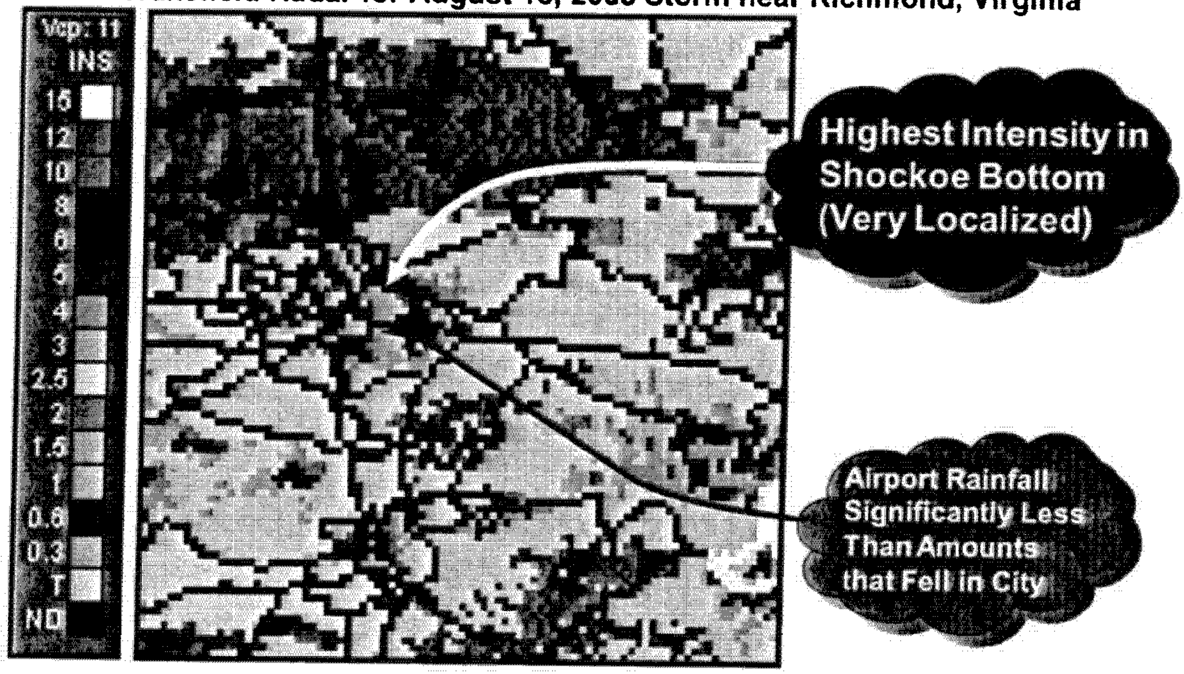


Figure 2
Wakefield Radar for Tropical Storm Gaston near Richmond, Virginia



Source: NWS at Wakefield

Figure 3
Wakefield Radar for August 18, 2006 Storm near Richmond, Virginia



Source: NWS at Wakefield

Exhibit B
To Comments on the Draft Chesapeake Bay TMDL by the Alexandria Sanitation Authority, and the Cities of Alexandria, Lynchburg, and Richmond

-----Original Message-----
From: Antos.Katherine@epamail.epa.gov [mailto:Antos.Katherine@epamail.epa.gov]
Sent: Wednesday, October 27, 2010 6:29 PM
To: Smith.Mark@epamail.epa.gov; Cronin, Edward; Pat Bradley; Zhou.Ning@epamail.epa.gov; gshenk@chesapeakebay.net; Alan Pollock; Allan Brockenbrough; Day.Christopher@epamail.epa.gov; Dave Evans; Scott Hinz
Cc: Tanya Spano; Victoria Kilbert; Trulear.Brian@epamail.epa.gov
Subject: Follow Up on VA CSO Discussion

Colleagues -
Thank you for this morning's call on calculating combined sewer system WWTP loads in Virginia's Phase I WIP, the Watershed Model, and the Chesapeake Bay TMDL. As we discussed, EPA expects in the Phase I WIPs that all WWTPs submit allocations based on design flow rather than dry weather flow, average wet weather flow treated through the facility, or peak flow. Using the Richmond plant as an example, this would equate to a flow of 75 mgd. EPA will calculate the Chesapeake Bay TMDL WLA based on the flow multiplied by the concentration. This approach ensures consistency among all WWTPs and CSO communities in the watershed.

If VA is interested in pursuing alternative approaches for the Phase II WIPs such as average wet weather flow, the jurisdiction should work through the Chesapeake Bay Program Wastewater Workgroup, coordinated by Ning Zhou. Ning agreed to place this issue on the next Workgroup agenda if VA is interested in proposing alternative approaches.

Thank you, and please let us know if you have any follow up questions.
Katherine

Katherine Wallace Antos
Chesapeake Bay Program Office
U.S. Environmental Protection Agency
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Annapolis, MD 21403

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Exhibit C (Pg 1 of 2)
Virginia James River Basin
Basis to Adjust EPA's Allocations and Percent Reductions

Table C-1

EPA 2010 No Action							
		Delivered			Edge of Stream		
Major Trib	Source	TN (lbs/yr)	TP (lbs/yr)	Sediment (mil lbs/yr)	TN (lbs/yr)	TP (lbs/yr)	Sediment (mil lbs/yr)
James River Basin, Virginia	Agriculture	5,897,528	1,076,566	940	12,055,237	1,874,644	1,476
	Urban runoff	2,956,973	665,128	201	4,157,021	866,239	247
	PS	33,473,882	5,237,086	63	37,394,673	5,766,989	67
	Septic	962,951	0	0	1,790,443	0	0
	forest	5,516,675	514,995	281	12,282,657	897,332	429
	Non-Tidal Water Dep	299,770	28,154	0	504,040	42,695	0
	All Sources	49,107,779	7,521,929	1,486.3	68,184,070	9,447,898	2,218

Table C-2

EPA's E3							
		Delivered			Edge of Stream		
Major Trib	Source	TN (lbs/yr)	TP (lbs/yr)	Sediment (mil lbs/yr)	TN (lbs/yr)	TP (lbs/yr)	Sediment (mil lbs/yr)
James River Basin, Virginia	Agriculture	2,798,331	545,944	387	4,997,162	783,453	577
	Urban runoff	1,098,860	152,218	18	1,409,586	177,214	21
	PS	5,697,419	220,787	8	6,331,302	240,030	8
	Septic	439,201	0	0	725,129	0	0
	forest	6,126,567	593,453	273	11,523,201	847,579	396
	Non-Tidal Water Dep	288,268	33,101	0	447,281	42,695	0
	All Sources	16,448,647	1,545,503	685.7	25,433,662	2,090,971	1,002

Table C-3

EPA's Allocation from App Q-1							
		Delivered			Edge of Stream		
Major Trib	Source	TN (lbs/yr)	TP (lbs/yr)	Sediment (mil lbs/yr)	TN (lbs/yr)	TP (lbs/yr)	Sediment (mil lbs/yr)
James River Basin, Virginia	Agriculture	5,371,812	712,269	492	13,492,814	1,167,857	735
	Urban runoff	1,901,004	325,370	78	2,519,395	418,475	97
	PS	8,360,115	747,820	9	9,380,906	895,657	14
	Septic	1,084,825	0	0	1,791,941	0	0
	forest	6,454,847	535,049	291	12,127,903	881,079	423
	Non-Tidal Water Dep	327,396	29,493	0	504,074	42,700	0
	All Sources	23,500,000	2,350,000	869.4	39,817,033	3,405,768	1,268

Table C-4 = [(Table C-3 - Table C-1) / Table C-1]

Percent Increase or (Reduction) to meet EPA's Allocation							
		Delivered			Edge of Stream		
Major Trib	Source	TN	TP	Sediment	TN	TP	Sediment
James River Basin, Virginia	Agriculture	(9%)	(34%)	(48%)	12%	(38%)	(50%)
	Urban runoff	(36%)	(51%)	(61%)	(39%)	(52%)	(61%)
	PS	(75%)	(86%)	(86%)	(75%)	(84%)	(78%)
	Septic	13%			0%		
	forest	17%	4%	3%	(1%)	(2%)	(2%)
	Non-Tidal Water Dep	9%	5%		0%	0%	
	All Sources	(52%)	(69%)	(42%)	(42%)	(64%)	(43%)

Exhibit C (Pg 2 of 2)
Virginia James River Basin
Basis to Adjust EPA's Allocations and Percent Reductions

Table C-5 = [(Table C-2 - Table C-1) / Table C-1]

Percent Increase or (Reduction) to meet EPA's E3

Major Trib	Source	Delivered TN	Delivered TP	Delivered Sediment	Edge of Stream TN	Edge of Stream TP	Edge of Stream Sediment
James River Basin, Virginia	Agriculture	(53%)	(49%)	(59%)	(59%)	(58%)	(61%)
	Urban runoff	(63%)	(77%)	(91%)	(66%)	(80%)	(91%)
	PS	(83%)	(96%)	(88%)	(83%)	(96%)	(88%)
	Septic	(54%)			(60%)		
	forest	11%	15%	(3%)	(6%)	(6%)	(8%)
	Non-Tidal Water Dep	(4%)	18%		(11%)	0%	
	All Sources	(67%)	(79%)	(54%)	(63%)	(78%)	(55%)

Table C-6 = Table C-4/ Table C-5

EPA's Allocation as Percent of EPA's E3

Major Trib	Source	Delivered TN	Delivered TP	Delivered Sediment	Edge of Stream TN	Edge of Stream TP	Edge of Stream Sediment
James River Basin, Virginia	Agriculture	17%	69%	81%	(20%)	65%	82%
	Urban runoff	57%	66%	67%	60%	65%	66%
	PS	90%	89%	98%	90%	88%	89%
	Septic	(23%)			(0%)		
	forest	154%	26%	(113%)	20%	33%	20%
	Non-Tidal Water Dep	(240%)	27%		(0%)		
	All Sources	78%	87%	77%	66%	82%	78%

Table C-7 (Adjust Agricultural Sector to Match BMP Performance)

Adjusted Percent Increase or (Reduction) to Match Expected BMP Performance

Major Trib	Source	Delivered TN	Delivered TP	Delivered Sediment	Edge of Stream TN	Edge of Stream TP	Edge of Stream Sediment
James River Basin, Virginia	Agriculture[1]	(43%)	(40%)	(48%)	(48%)	(48%)	(50%)
	Urban runoff	(36%)	(51%)	(61%)	(39%)	(52%)	(61%)
	PS	(75%)	(86%)	(86%)	(75%)	(84%)	(78%)
	Septic	13%					
	forest	17%	4%	3%	(1%)	(2%)	(2%)
	Non-Tidal Water Dep	9%	5%				
	All Sources	(52%)	(69%)	(42%)	(42%)	(64%)	(43%)

Note: (1) Sediment requires a level of control at 81% of E3. Use same 81% of E3 as basis of Agricultural TN and TP allocations.

Table C-8

Example of Basis to Adjust PS Allocation

Major Trib	Source	Delivered TN (lbs/yr)	Delivered TP (lbs/yr)	Delivered Sediment (mil lbs/yr)	Edge of Stream TN (lbs/yr)	Edge of Stream TP (lbs/yr)	Edge of Stream Sediment (mil lbs/yr)
James River Basin, Virginia	Agriculture	3,387,402	646,801	492	6,237,119	975,153	735
	Urban runoff	1,901,004	325,370	78	2,519,395	418,475	97
	PS	8,360,115	747,820	9	9,380,906	895,657	14
	Septic	1,084,825	0	0	1,790,443	0	0
	forest	6,454,847	535,049	291	12,127,903	881,079	423
	Non-Tidal Water Dep	327,396	29,493	0	504,040	42,695	0
	All Sources	21,515,590	2,284,532	869.4	32,559,806	3,213,059	1,268
	Draft Bay TMDL Allocation	23,500,000	2,350,000	869.4			
	Assign Difference to PS	1,984,410	65,468	0.0			